

A report on *Gratidia* sp. from Zaire (PSG 141), and a study of the hatching of the eggs.

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Drawing of egg by Oliver Zompro.

Abstract

The adults of an unidentified species of *Gratidia* from Zaire (PSG 41), are briefly described. The egg is illustrated and data on egg laying rates, incubation time and hatch rates are presented.

Key words

Phasmida, *Gratidia* sp., rearing, eggs, laying, incubation, hatch rate.

Introduction

This species belongs to the family Heteronemiidae, sub-family Pachymorphinae, tribe Gratidiini, and genus *Gratidia* Stål; the species is unidentified. This species was previously referred to *Ramulus* Saussure (see Bragg, 1995). A lot of species belongs to this genus and the determination is very difficult, because the differences between the species are very slight. The culture originated in Zaire.

Male

The male is about 50-58mm in length and has a colour varying from green to brown, with a reddish mesothorax and metathorax. There is a green stripe on the mesothorax and metathorax on both sides of the thorax. The legs are very long. The femora of the middle and hind legs are greenish. The tibiae and tarsi are brownish. The coxa are greyish. There are no spines on legs or body. The antennae are 13-14mm long with 17 segments and are a beige colour. A lot of fine hairs are on the antennae. The head is beige and has a brown stripe on each side. The abdominal apex is yellowish and as broad as the body. Two cerci situated on the abdominal apex look like a hoop.

Female

It has a greenish or brown colour of the body, with a length of about 75-80mm. The width of the 3rd and 4th abdominal segments is about 2.5-3.0mm. The inter-segmental skin is white. The colour is very variable depending on the humidity in the cultures. The antennae are shorter than the male's antennae; they have 18 segments but are only 5-6mm long. The sub-genital plate is very long, it reaches to the end of the abdomen. The cerci are much longer than the end of the abdomen.

Nymphs

When the nymphs hatch they have a length of 11-13mm. The colour is yellowish or pale yellow-white. The body is like a thread. The nymphs change their skin 6 or 7 times. After 4 months they are adults.

Eggs

The eggs have a lengths of 4.6mm and a width of 1.0mm and a height of 1.2mm. An egg in profile lets us see that the operculum is tilted towards the micropylar plate (fig. 1). The colour is beige. The operculum is flat with irregular marks. On the sides of the operculum we can find a crown of spines. The micropylar plate is a very small ellipse, which is enclosed by a strip running from the operculum edge to the polar end. The eggs are glued to the side of the cage or to the foodplant.



Figure 1.
Egg of PSG 141.

The laying and hatching dates for one female.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
February laid														adu						cop				cop								
hatched																										2	3	2	2			
in April																											3	2				
in April																											3	2	1			
in April																											23	23	26			
																											23	24				
																											26					
March laid	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
hatched	4	2	4	2	3	3	0	2	2	3	3	2	2	3	3	4	4	4	4	5	3	0	2	4	3	5	5	0	6	1	3	
in May				1	1	3	0			1	1		1	3	1			4	2		1	0		2		5						
			1	4	2	2	0		6	6			12	8	18			11	13				20	18		20						
				7		4								10				12	13					20								
					7	7								10				20									21					
						7								10													22					
						7								10													22					
						7								10													22					
						7								10													22					
in June																						1							1			
April laid	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
hatched	2	4	2	2	4	2	2	0	3	2	3	4	3	2	2	3	4	2	4	3	3	3	3	2	0	3	2	2	2	4		
in May			1	1	2	2			2	1	1		2	2	2	3	1	1		2	2	1		1		3	1	2	1	4		
in June			28	28	30	6			6	4	7		7	7	9	10	7	9		13	14	17		17		22	17	22	23	23		
					1	6			9				9	11	11	11		9		13	17					25	25	25		29		
						6										12														2		
in July																																
May laid	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
hatched	2	2	4	1	3	1	2	1	4	4	4	5	2	0	4	1	3	0	2	2	5	3	4	3	2	0	2	3	3	4	1	
in June	1	1				1			2	1		1		0	1			0		1	3					0	2		1	1	1	
in July	18	30				30			30																							
									3	3		4			6						8	8						9		21	18	20
June laid	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
hatched	2				dead																											

Egg laying behaviour

The female searches with her front legs and the antennae for a good place for the egg. If she has found one, she bends her abdomen end between the antennae, over her thorax. The antennae place the eggs in the right position; the legs help them, but the most work is done by the antennae. Usually *Gratidia* lays her eggs in the same place, so we can find in a cage a lot of eggs in the same place.

Defence reaction

When concerned the phasmids form a ball for the first defence reaction. All legs, the abdomen and the thorax form a ball. The legs get lifted under the thorax, and the abdomen goes over the thorax to the head. In this situation she jumps at short intervals, similar to a tree in a strong wind. The second reaction is the autotomy of the legs, she loses her legs. Avoid all physical contact with the legs, if you want phasmids with all their legs.

Breeding conditions

The insects needs good climatic conditions, with a good ventilation and low humidity (40-60 % RH). I keep them in 22-25°C. From time to time I sprayed in the cage a little bit of water. If there is a high humidity (60-90% RH), you will lose the most of your insects due to diarrhoea and losing the legs.

Foodplants

Bramble is the favourite, raspberry, and strawberry are also eaten. Oak and ivy are also possible but are not so good for successful breeding.

The study of egg hatching

Lelong (1995) wrote that the hatching date of the nymphs is one month after the laying date. I can not agree with this, because my results about the hatching dates these eggs showed something different. I kept 5 females and all were in separate cages. I collected all laid eggs

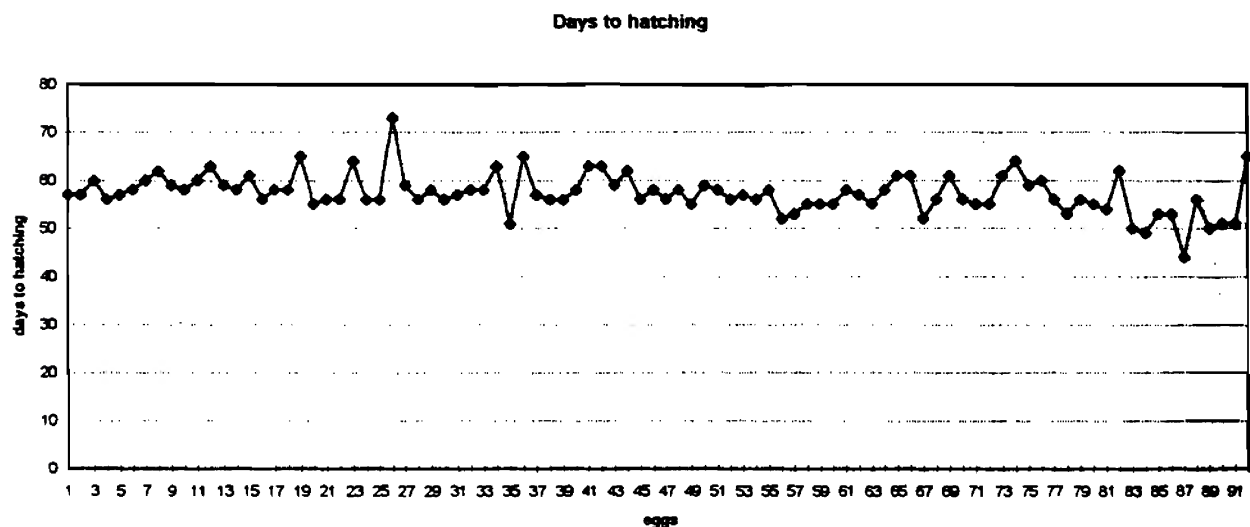


Figure 2. Incubation time for eggs of PSG 141.

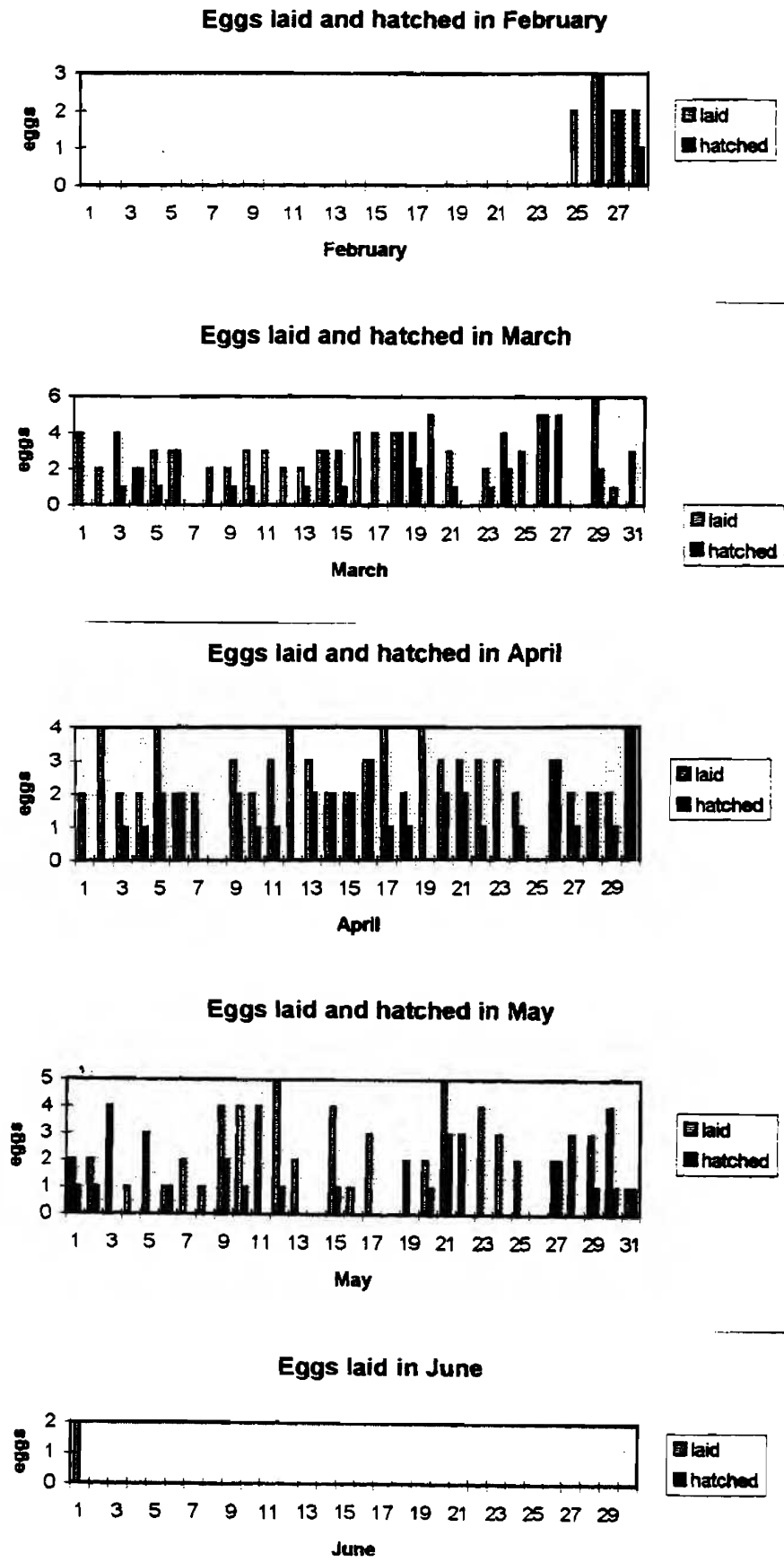


Figure 3. Number of eggs laid on each day, and number of those which hatched.

and separated them into small jars for each day. The eggs were kept in separate jars with the date of laying and the number of the laid eggs on this day. There were the same conditions in each jar; the conditions were about 50-60% RH and 22-25°C. The eggs hatched out two months after laying. Most eggs hatched in the morning, between 0600 and 0800.

Table 1 gives the laying and hatching dates for all the eggs from one female. For each day of the insect's adult life the table gives the number of eggs laid, the number of those eggs which hatched, and the dates on which they hatched. The row for the number of eggs laid is also used to indicate the dates on which the insect became adult ("adu"), dates when copulation was observed ("cop"), and the date on which it died ("dead"). The data for this female is similar to the average. From 255 eggs, 92 hatched out, a hatching rate of 36%. The mean incubation period was 57.4 days, with a range of 44-73 days. These rates varied very little between the five females. Figure 2 illustrates the variation in incubation time. Figure 3 shows the number of eggs laid each day, and how many of these hatched.

I can not believe that hatching rates of 80-90% recorded for most species is normal. If you start culturing a species with 30 or 40 eggs such hatching rates are probably possible, but mostly you will not get this result with all the eggs laid. In most articles we can find a high hatching rate stated, but the culture was started by 30 or 40 eggs.

References

- Bragg, P.E. (1995) Type species of phasmid genera with particular reference to the status of *Baculum* Saussure, 1861, *Ramulus* Saussure, 1862, and *Gratidia* Stål, 1875. *Phasmid Studies*, 4(2): 11-14.
Lelong, P. (1995) *Ramulus* sp. PSG n° 141. *Le Monde des Phasmes*, 30: 26-28.

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